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Sleep quality and its associated factors among postoperative patients: A cross-sectional study

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Abstract

Sleep is very important and necessary for human health. For patients undergoing surgery, they should have good sleep to restore both physiological and psychological health. This has a positive impact on the process of recovering damaged tissues, helping to heal wounds earlier, preventing complications, shortening the length of hospital stay, and reducing treatment costs. **Objectives:** This study was conducted to examine the quality of sleep and identify associated factors in patients who underwent surgery at the General Surgical Ward, Tay Nguyen Regional General Hospital. **Research subjects and methods:** A cross-sectional descriptive study was performed on 374 postoperative patients who met the sampling criteria and randomization. Data was collected through the interview technique using a structured questionnaire. Sleep quality was assessed by the Pittsburgh Sleep Quality Index instrument. **Results:** 78.1% postoperative patients had poor sleep quality with mean score of PSQI scale was 10.3 (range: 0-21; SD= 3.27). Most of the patients had a subjective assessment of sleep quality at fairly bad (27.8%) and very bad (41.7%). Age group is one of the non-environmental factors associated with sleep quality in this population. Environmental factors, including lighting in the patient's room, activities of medical staff, and noise from equipment, are associated with the patient's sleep quality ($p < 0.05$).

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Introduction

Sleep represents an essential element for human health and well-being. It is a neurologically dynamic behavior with physical quiescence, an elevated arousal threshold, and a state of rapid reversibility. The function of sleep is to restore the body during periods of inactivity to ensure adequate biological activity, such as restoring energy, repairing brain and body tissues, and reducing metabolic rate ^[16]. For postoperative patients, sleep helps promote the recovery process of both physiological and psychological health. It will have a positive impact on the recovery process of damaged tissues, helping to heal wounds early, prevent complications, and shorten hospital stays, reducing treatment costs.

Sleep quality is a complex phenomenon that is difficult to define and measure objectively. It is the subjective perception of sleep parameters, including sleep onset, sleep maintenance, total sleep time, early awakening, restlessness during the night, etc ^[9]. However, poor sleep quality is a common issue faced by patients during hospital treatment, especially in the early postoperative period. Sleep quality disorders can negatively affect people's feelings, ideas, and motivation ^[5]. In postoperative patients, the prevalence of sleep disturbance has been shown to be up to 67% ^[15]. The problems that patients often encounter are difficulty falling asleep, waking up more after starting to sleep, not being able to get back to sleep, sleeping ineffectively, reducing total sleep time, and the feeling of sleepiness after waking up in the morning ^[4, 11]. Many studies have shown that poor sleep quality can have negative impacts on health outcomes, including fatigue, depression, stress, slow wound healing, and increased pain ^[4].

6, 8]. It is also associated with a significant impairment in the ability to perform activities of daily living [18]. In Vietnam, the researches focused on the sleep quality of patients after surgery are limited. This study was conducted to examine the quality of sleep and identify associated factors in patients after surgery at Tay Nguyen Regional General Hospital. This is the biggest hospital in the Central Highlands of Vietnam. The findings of this study also provide a better understanding of sleep quality and its associated factors in postoperative patients. Moreover, the nurses should develop appropriate nursing interventions to improve sleep quality in these patients by controlling the above factors. As a consequence, it contributes to optimizing the patient's comfort, shortening the length of hospital stay, and reducing treatment costs.

Objectives

1. Examine quality of sleep among postoperative patients at General Surgical Ward, Tay Nguyen Regional General Hospital.
2. Identify the factors associated with sleep quality among postoperative patients at General Surgical Ward, Tay Nguyen Regional General Hospital.

Research Methodology

A. Design and setting

A cross-sectional descriptive study was conducted at general surgical ward, from March to July 2021.

B. Sample

A sample of 374 patients who undergone surgery and admitted on the 3rd day at general surgical ward, Tay Nguyen Regional General Hospital, Vietnam. They were recruited by using a simple random sampling technique.

Inclusion criteria were: (1) age from 18 and older, (2) agree to participate in the study, (3) no history of chronic disease that affect sleep quality (depression, cancer, rheumatoid arthritis).

Exclusion criteria were: (1) patients who currently lost their behavioral and mental capacity, e.g dumb, deaf, unable to communicate, (2) have undergone surgery at the primary medical level.

C. Research instruments

Data were collected through interviews using the structured questionnaire, which included two parts:

Part 1: Demographic and clinical characteristics. Some information on pathological and surgical characteristics was obtained from medical records.

Part 2: Patient's sleep quality, using the Vietnamese version of the Pittsburgh Sleep Quality Index (PSQI) questionnaire. Nineteen individual items in the questionnaire generate seven "component" scores: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and day-time dysfunction. The scoring of responses was based on a Likert scale (from 0 to 3). The total PSQI score ranged from 0 to 21 points. A total PSQI score ≤ 5 was considered good sleep quality. A total PSQI score > 5 indicates poor sleep quality.

D. Data analysis

Data were coded and analyzed using Statistical Package for Social Sciences (SPSS) version 20.0. Descriptive statistics were used to describe the general characteristics. We used frequency and percentage to describe the qualitative variables, and mean \pm SD for quantitative variables. The Chi-square tests were used to analyze the relationship between the factors and poor sleep quality. The level of significance was set at the alpha level of .05.

E. Ethical considerations

Before collecting the data, the study protocol was approved by the IRB of Tay Nguyen University for human subject research. The researcher asked permission to collect data from the Board of Directors of Tay Nguyen Regional General Hospital. Patients were clearly informed about the study's aims and data collection procedure and signed the consent form. All data was stored and utilized only for this study.

Results and Discussion

A. General characteristics of participants

From Table I, the study results showed that the average age of participants was $50,9 \pm 16,54$ years, with the higher proportion (55.1%) being in the ≥ 50 years old group. The prevalence of Kinh people was 68.7%. Regarding gender, females comprised the majority group (61.2%). This rate is similar to other study at a university Hospital in Turkey with the average age of the study subjects being 58.9 ± 15.6 years. In contrast, males were the majority group in this study (71.0%) [14]. When compared with a study in Ethiopia by author Tegegne, the proportion of female is only 43.4% [17]. This difference might be due to having a larger sample size, and sociodemographic differences of the study participants. Most patients have operated on the appendix (24.3%), followed by surgery of the hepatobiliary system (19.3%), thoracic system (19%), gastrointestinal system (16%), colon-rectum (13.9%), and pancreas (7.5%). There were 67.9% of patients who applied the open surgery method. In the study of Özkan, it was determined that 40% of the patients underwent non-oncologic abdominal surgery and 82% of them had elective surgery.

Table 1: Demographic and clinical characteristics of participants (n = 374)

	Characteristics	Freq.	Percent (%)
Age	Mean \pm SD = 50.9 \pm 16.54		
	≤ 50 years	168	44.9%
	> 50 years	206	55.1%
Ethnicity	Kinh people	257	68.7%
	Ethnic minority	117	31.3%
Gender	Male	145	38.8%
	Female	229	61.2%
Surgical organ	Gastrointestinal system	60	16.0%
	Hepatobiliary system	72	19.3%
	Colon - rectum	52	13.9%
	Appendix	91	24.3%
	Pancreas	28	7.5%
	Thoracic	71	19.0%
Types of surgery	Laparoscopic surgery	120	32.1%
	Open surgery	254	67.9%

B. Sleep characteristics among postoperative patients

Table 2: Characteristics of sleep quality among patients after surgery

Variables	Freq.	Percent	Variables	Freq.	Percent
Subjective sleep quality			Habitual sleep efficiency		
Very good	19	5.1	≥ 85%	54	14.4
Fairly good	95	25.4	75-84%	74	19.8
Fairly bad	104	27.8	65-74%	76	20.3
Very bad	156	41.7	< 65%	170	45.5
Sleep duration			Sleep disturbances		
> 7 hours	32	8.6	None	54	14.4
6 - 7 hours	46	12.3	Mild	74	19.8
5 - 6 hours	158	42.2	Moderate	76	20.3
< 5 hours	138	36.9	Severely	170	45.5
Day time disfunction			Sleep latency		
None	13	3.5	16 -30 minutes	72	19.3
Mild	176	47.1	31 – 60 minutes	102	27.3
Moderate	146	39.0	> 60 minutes	200	53.4
Severely	39	10.4	Use of sleeping medication	0	0
Total PSQI: Mean ± SD = 10.3 ± 3.27			Good sleep quality (≤5)	82	21.9
			Poor sleep quality (>5)	292	78.1

Based on the PSQI instrument, the mean score of total PSQI during the post-operative period was 10.3 (range: 0–21; SD = 3.27). The results show that the majority of participants had poor sleep quality (78.1%, n = 374) (Table II). This result is higher than the study result of Chu Thi Chi in 2020, which performed on 140 spine surgery patients at 70% [3]; or another study in South India by author Prakrithi at 67% [15]. However, this is lower than the result of Buyukyilmaz on Turkish orthopedic patients, with 83% of postoperative patients having poor sleep quality [2]. In Amhara regional comprehensive referral hospitals, study of Tegegne and Alemnew examined postoperative sleep quality and determined that 64.9% patients had a poor sleep quality among adult surgical patients [17]. Conducting research on patients after breast cancer surgery, Phan Thi An Dung announced that 100% of patients showed sleep disturbances [7]. Of these, 42.5% had severe sleep disturbances, 51.7% reported moderate sleep disturbances, and 5.8% had mild sleep disturbances.

According to the results of Table II, most of the patients had a subjective assessment of sleep quality at fairly bad (27.8%) and very bad (41.7%). Regarding habitual sleep efficiency, only 14.4% of patients had sleep efficiency above 85%, and up to 45.5% of patients had sleep efficiency below 65% (table II). This result is inconsistent with the study by author Chu Thi Chi that performed spine surgery [3]. The study result reported that just 28.6% of the patients had subjective sleep quality at fairly bad and very bad; 34.3% of patients reported sleep efficiency as less than 65%; 30.7% of the patients rated the sleep efficiency above 85%; and 34.3% of the patients rated the sleep efficiency less than 65%. Besides, our research shows that the majority of study subjects' sleep duration ranged from 5 to 6 hours (42.2%). In contrast, a study by Chu Thi Chi [3] reported that 40% of patients in the study had <5 hours of sleep per night, and 32.1% of patients used sleeping

pills before going to bed after surgery. This can be explained by the differences in clinical characteristics and treatment methods of the study's population. Due to the nature of the disease patients may experience stress, and stress may lead to interruptions in sleep. For instance, this research was conducted on a group of patients after spinal surgery. Most of the patients participating in the study received surgical intervention performed on the lumbar spine, accounting for 83.6%. The main method of anesthesia used is 75.7%.

C. Factors associated with sleep quality after surgery (n=374)

From Table III, the results show that the age group was the factor associated with the sleep quality among the participants. A significant difference was found between the two age groups. The proportion of participants over 50 years old with poor sleep quality is 2.02 times higher than that of participants under 50 years old, which is statistically significant with $p < 0.05$. The research group has a slightly high average age (Mean = 50.9; SD = 16.54). This age is lower than the research group of Chu Thi Chi, which has Mean= 55.7; SD = 15.1 [3]. However, the results are quite similar to the study in Thailand by author Kulpatcharapong, with the average age of research participants being 50.8 ± 16.7 [12]. Study of Bihari at Flinders Medical Centre, South Australia, reported that gender and age affect the sleep quality of patients in the ICU with OR = 1.02 (1.01–1.03), $p < 0.01$ [1]. In fact, as age increases, the body gradually undergoes physiological and psychological changes such as hormonal changes, disease risk, etc. These changes have clear effects on the duration of life and sleep quality. It was determined that as the age of patients increased, they fell asleep more slowly, woke up more frequently and slept with a longer duration of staying awake.

Table 3: Relationship between non-environmental factors and sleep quality after surgery (n=374)

Factors		Quality of sleep		p (CI: 95%)
		Good	Poor	
Age	≤ 50 years	38	130	p = 0.005 OR = 2.02 (1.23- 3.32).
	> 50 years	44	162	
Gender	Female	37	108	p = 0.18 OR = 1.26 (0.75- 2.12)
	Male	45	184	
Types of surgery	Laparoscopic surgery	31	89	p = 0.2 OR = 1.38 (0,83- 2,31)
	Open surgery	51	203	

Contrary to our result, a study of Prakrithi in 2019 reported that it did not find a statistically significant difference between age groups [15]. In the study with surgical intensive care patients, author Özkan determined that a positive and weak correlation was found between age and the sleep quality [14]. Study of Tegegne and Alemnew reported that patients

aged 25-54 years were 15.2 times more likely to have sleep disorders in the postoperative period compared to elderly patients. Regarding gender, male patients were 4.81 times more likely to develop the poor postoperative quality of sleep compared with those female surgical patients [17].

Table 4: Relationship between environmental factors and sleep quality after surgery (n=374)

Factor	Quality of sleep		OR (CI = 95%)	p-value
	Good n (%)	Poor n (%)		
Light exposure				
No	40 (28,8)	99 (71,2)	1,85	p = 0,01
Yes	42 (17,9)	193 (82,1)	(1,13- 3,04)	
Health staff activities				
No	45 (35,4)	82 (64,6)	3,11	p < 0,001
Yes	37 (15)	210 (85)	(1,88- 5,15)	
Equipment's noise				
No	28 (12)	206 (88)	4,62	p < 0,001
Yes	54 (38,6)	86 (61,4)	(2,74- 7,78)	
Talking around				
No	32 (23,7)	103 (76,3)	1,17	p > 0,05
Yes	50 (21,9)	189 (78,1)	(0,70- 1,94)	

This research result shows that environmental factors are associated with patients' sleep quality, including hospital room lighting, activities of health staff, and equipment noise. In which, hospital room lighting (p = 0.01; OR = 1.85 (1.13–3.04); activities of medical staff (p < 0.001; OR = 3.11 (1.88–5.15)); noise emitted from surrounding devices (p < 0.001; OR = 4.62 (2.74–7.38), respectively (table IV). It was found that sleep was adversely affected by environmental factors. This result can be explained by the fact that lights must always be on in hospital rooms so that medical staff can monitor each patient's progress during the night. At the same time, there are interventions that need to be actively monitored and handled promptly, such as suctioning sputum, giving the patient oxygen, changing infusion fluids, checking infusion machines, electric injection pumps, etc. In addition, there are always warning sounds from monitors or phone rings from both medical staff and other patients. Patients have difficulty adapting to the hospital environment and are affected by such "strange" noises, leading to poor sleep quality.

This result is consistence with both studies of other authors in Vietnam and foreign countries. These studies have determined noise as a factor that negatively affects the sleep quality of postoperative patients [10, 13, 17, 19]. Conducting study in patients after surgery, Lane and East announced that environmental factors, including warning sounds from monitors, impacts from staff and other patients, and hospital bed conditions, are highly correlated with patient sleep

disorders (r = 0.8) [13]. Research of Nguyen Thi Truong Xuan in 2013 [19] on abdominal surgery patients at a hospital in Binh Duong also announced that factors influencing the care environment are related to the patient's sleep quality. multiply (R² = 0.17; p < 0.001); Mai Ba Hai (2018) with r = - 0.58, p < 0.001 [10]. Other study of Tegegne and Alemnew revealed that postoperative patients who were exposed to light radiation in their waiting room were 19.1 times more likely to develop a poor quality of sleep compared with those patients who had lived in dark rooms [17].

In this study, an interesting thing is that no relationship was found between noise from talking of caregivers and other patients and sleep quality. This finding was inconsistent with previous studies which conducted in Vietnam, such as at Binh Duong General Hospital [19] and Hue University Hospital [10]. These authors confirmed that noise from other patients or roommates in hospital affects patient's night sleep. Among subscale of disturbances from the care-environment scale, noise from talking of caregivers and other patients were the most disturbed patient's night sleep. It was explained that caregivers were allowed to stay bedside of patients during the night time, and the patient's room was small, therefore any noise from other could disturb patient's night sleep [10, 19]. Regarding the noise from talking caregivers and other patients, the result of this study can be explained by the setting of the clinical ward at that time. The timing for collecting the data was carried out from March to July 2021. At that time, the COVID-19 pandemic situation was

progressing complicated in our hospital and also in Vietnam. To fight the pandemic, the hospital has applied strict regulations for patients and visitors. For instance, people have to wear the mask all the time. Besides, the hospital also limited on number of visitors, timing for visiting, etc. This ward was allowed only one visitor by one patient, and they stayed by the patient's side at night. This has significantly limited the impact of the noise from talking of caregivers and other patients.

Conclusions

The results of this study showed that the proportion of post-surgical patients with poor sleep quality is high (78.1%). Indeed, it was determined that sleep quality affected by many factors, was poor in postoperative patients. It can be said then both environmental factors and non-environmental factors have a dominant effect on sleep. Based on the present study; patients aged over 50 years old had a significant association with poor sleep quality. Environmental factors, including hospital room lighting, activities of health staff, and equipment noise are associated with the patient's sleep quality ($p < 0.05$). Therefore, healthcare providers should prioritize postoperative sleep quality assessment and manage the associated factors appropriately. It is extremely essential to improve the patient's sleep quality, helping the patient recover fastest and most comprehensively in the postoperative period.

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